

# Abdominal and Pelvic Coccidioidomycosis

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**Abstract:** Coccidioidomycosis is a fungal infection endemic to the Southwestern United States that has a clinical presentation resembling community-acquired pneumonia. Disease occurs after inhalation of airborne arthroconidia. Dissemination to a variety of organ systems via hematogenous spread from a primary pulmonary focus may then occur. Coccidioidomycosis rarely involves the abdominal cavity. The authors review the spectrum of abdominal and pelvic presentations of coccidioidomycosis and report 6 unusual cases, including acute appendicitis, hepatitis and adnexal masses. Pathologists played a critical role in the diagnosis of these presentations by recognizing spherules in tissue. In only 2 of the cases were *Coccidioides* species cultured.

**Key Indexing Terms:** *Coccidioides*; Coccidioidomycosis; Appendicitis; Hepatitis; Pelvic tumors. [Am J Med Sci 2011;341(4):308-311.]

Primary pulmonary coccidioidomycosis may be asymptomatic or present as community-acquired pneumonia.<sup>1</sup> In a small percentage of cases, dissemination of disease from the lung to other organs occurs. Immunocompromised patients, patients with HIV, persons of African and Filipino ancestry and pregnant women seem to be at increased risk for dissemination.<sup>2</sup> Lesions may arise in many tissues after hematogenous dissemination, but most commonly involve the skin, bone, joints and central nervous system.<sup>2</sup> Infection of the abdomen and its contents is rarely reported, peritonitis being the most common abdominal presentation of coccidioidomycosis.<sup>3</sup> Disease involving other organs of the abdominal cavity such as the intestines, liver, fallopian tubes and omentum are rarely reported.<sup>4-14</sup> Abdominal infections often present nonspecifically and may mimic other infections or cancers, and the diagnosis usually rests on examination of tissue.<sup>6-8</sup>

We describe several unusual presentations of coccidioidomycosis of the abdominal cavity and review the pertinent literature. The importance of considering this rare cause of abdominal infection, particularly in endemic regions of coccidioidomycosis, is discussed.

## CASE 1: ACUTE APPENDICITIS

A 56-year-old man was hospitalized with abdominal pain in 2007. He complained of diarrhea but denied fever, cough, shortness of breath or chest pain. He was a long-term resident of Sonora, Mexico, and moved recently to southern Arizona. His physical examination was unremarkable with exception of right lower quadrant pain. A chest x-ray was normal. Stool gram stain showed eosinophils. The white blood cell count was 12,800 cells/ $\mu$ L with a normal differential count. He was diagnosed with appendicitis. A perforated appendix was found at surgery, and pathologic examination of the appendix showed acute mucosal ulceration and transmural in-

flammation typical of acute appendicitis. The serosa and the muscularis were infiltrated with numerous well-formed granulomas containing spherules of *Coccidioides* (Table 1; Figure 1). There was no evidence of coccidioidomycosis involving other organ systems.

A *Coccidioides* immunodiffusion complement fixation (IDCF) titer at presentation was 1:32 and fell to less than 1:2 while on fluconazole for 2 years. The patient is off antifungal therapy and is asymptomatic.

## CASE 2: INTESTINAL AND OMENTAL INFECTION

An 86-year-old man lived in Tucson, Arizona, since 2003. In early 2006, the patient reported fatigue, nausea and loss of appetite with a 20-pound weight loss over 3 to 4 months. He denied respiratory symptoms or night sweats. A computed axial tomography scan of his abdomen and pelvis showed ascites, mesenteric fat stranding and lymphadenopathy. Biopsies of omental nodules disclosed granulomatous lymphadenitis. Mesenteric and small bowel tissue biopsies demonstrated spherules of *Coccidioides* (Table 1).

He was treated with fluconazole 400 mg daily. A *Coccidioides* IDCF titer was 1:8 on presentation and on therapy decreased to 1:2. The patient noted marked improvement of his symptoms while on treatment, and he remains well. No other organ systems were involved with coccidioidomycosis.

## CASE 3: HEPATITIS

A 57-year-old man from Phoenix, Arizona, had a history of heart transplantation 6 years previously and a 2-year history of hemodialysis. He had a history of primary pulmonary coccidioidomycosis and was taking fluconazole 200 mg daily since the diagnosis, but he stopped fluconazole 2 months before admission. He complained of diarrhea, weakness and abdominal pain for several months. He was diagnosed with cholecystitis and underwent an emergent cholecystectomy. During the operation, a liver biopsy was obtained, and *Coccidioides* spherules were observed in the liver parenchyma (Table 1). The white blood cell count was 11,300 cells/ $\mu$ L; the findings of liver function tests were normal, except a total bilirubin of 4.8 and direct bilirubin of 4.3. Blood and sputum cultures grew *Coccidioides*.

The *Coccidioides* IDCF titer was 1:4. He was treated with fluconazole at 600 mg daily. Follow-up blood cultures became negative within 5 days of treatment.

## CASE 4: INFECTION OF THE LIVER AND SPLEEN

A 6-year-old boy with no medical history complained of 2 months of intermittent fever and fatigue. On physical examination, he was found to have fever to 105°F, a fine sandpaper rash, coarse breath sounds and hepatosplenomegaly. A chest x-ray showed fine nodular opacities. A liver biopsy performed because of increased liver enzymes demonstrated granulomas, immature *Coccidioides* spherules and eosinophilic infiltration of the liver parenchyma (Table 1; Figure 2). Cerebrospinal

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TABLE 1. Summary of patient cases.

Case	Age/sex	Presenting complaints	Admitting diagnosis	Diagnosis established or confirmed by	Organ(s) involved	Treatment	Outcome
1	56/M	Abdominal pain and diarrhea	Appendicitis	Pathology (serology confirmed infection)	Appendix	Fluconazole X 2 years	Recovered
2	86/M	Fatigue, nausea and weight loss	Ascites, abdominal lymphadenopathy; possible cancer	Pathology (serology confirmed infection)	Small intestine and omentum	Fluconazole; remains on therapy	Recovered
3	57/M	Fever, abdominal pain, nausea and diarrhea	Cholecystitis	Pathology (culture and serology confirmed infection)	Liver, lung and bone marrow	Fluconazole; remains on therapy	Recovered
4	6/M	Fever and fatigue	Hepatitis	Pathology (culture and serology confirmed infection)	Liver, spleen, lung, thymus, brain, heart, kidneys, thyroid and bone marrow	Amphotericin-B	Died
5	64/F	Fatigue and weight loss	Adnexal mass; possible cancer	Pathology	Fallopian tube	Surgical removal; no antifungal drugs	Recovered
6	54/F	Bloating and increased abdominal girth	Pelvic mass; possible cancer	Pathology	Fallopian tube	Surgical removal; no antifungal drugs	Recovered

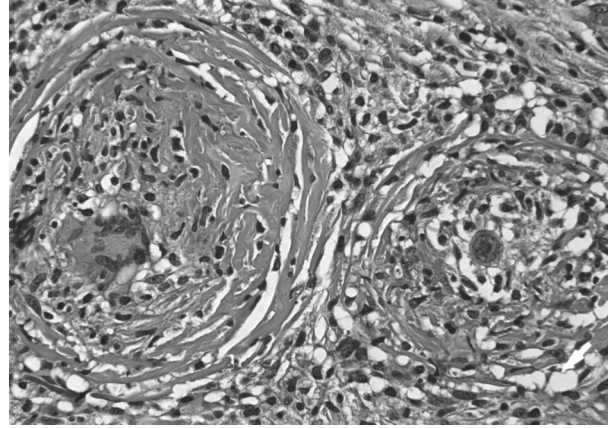


FIGURE 1. Case 1: Hematoxylin and eosin stain of appendiceal tissue. Two granulomas are shown, the right one containing a spherule in the center.

fluid, blood, urine and bronchoalveolar lavage fluid cultured *Coccidioides*. The *Coccidioides* IDCF titer was 1:32.

The patient required intubation shortly after his liver biopsy was performed and developed acute respiratory distress syndrome. Care was withdrawn after discussion with the family. Autopsy revealed extensive metastatic coccidioidomycosis involving nearly every organ of the body (Table 1).

#### CASE 5: ADNEXAL MASS AND SALPINGITIS

A 64-year-old woman with a history of poorly controlled type 2 diabetes mellitus, fatigue and weight loss was found to have a pelvic mass. Initial white blood cell count was 7000 cells/ $\mu$ L. Surgical exploration revealed an adnexal mass and a bilateral-salpingo-oophorectomy was performed. Ovarian tissue demonstrated serous cystadenoma, and fallopian tubes contained *Coccidioides* spherules (Table 1; Figure 3). After surgery, the patient noted improvement in her fatigue and weight loss; *Coccidioides* serology was not obtained, and she was not treated with antifungal agents. At her last recorded clinic visit, several years after the operation, she was doing fine.

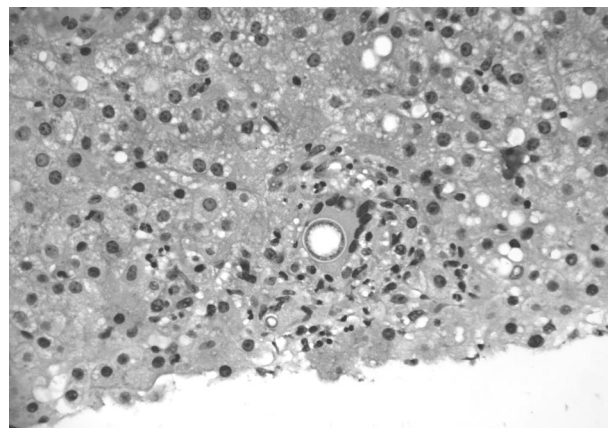


FIGURE 2. Case 4: Hematoxylin and eosin stain of liver parenchyma. Poorly formed granuloma with eosinophils in liver tissue; a giant cell contains a mature spherule of *Coccidioides* sp.

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